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Influence of Infrastructure, Investment and Human Resource to the Regional Economics Growth

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Abstract. The economic growth is one of important components to increasing society welfare. The economic contribution of Java island to Indonesian economic growth is greater than other islands. Therefore, it is interesting to study a research on the economic growth of Java island.
The purpose of this research are To analyze the effect of infrastructure (transport, electricity, clean water,) toward economic growth of the provinces in Java, the effect of non-infrastructure investment on economic growth areas of the province in Java, the effect of local worker to regional economic growth, the effect of local human capital on economic growth of the province in Java.
The object of the research are provinces throughout Java island, they are Jakarta province, West Java province, Central Java province, Yogyakarta province, East Java province, and Banten province. The duration of this research in 10 years, starting from 2000 – 2009. Log linear regression model and the method of Least Squares Dummy Variables (ISDV) were used to analyze panel data obtained.
The estimated result show that the increasing number of workers who worked has no significant effect on regional economic growth in Java island. Human capital has positive effect on economic growth. It means that improving the ability of the workforce through education and training will promote economic growth. The improvement of road infrastructure does not significantly influence toward economic growth area for the coverage of Java. Construction of electricity infrastructure has positive influence toward regional economic growth. Improved clean water infrastructure has positive effect on regional economic growth.

Keywords: Economic Growth, Infrastructure, Human Capital.

1. Introduction

Economic investment performance in recent years began to decline, before the global crisis of 2008 investment performance reached 9.3 (yoy) growth, but in 2009 the performance reach only 3.3%. Investment in qualified human resources and infrastructure sectors are the important investment to drive economic growth. The purposes of this study are: To analyze the effect of infrastructure (transport, electricity, clean water,) toward economic growth of the provinces in Java, the effect of non-infrastructure investment on economic growth areas of the province in Java, the effect of local worker to regional economic growth, the effect of local human capital on economic growth of the province in Java.

Research Methodology, Location of this research are Java Provinces that consist of Jakarta province, West Java, Central Java, Yogyakarta, East Java and Banten Provinces. This research covered ten years begining of 2000 to 2009. Data Analysis Method is Least Squares Dummy Variables (LSDV). Mathematical models used in this study is adapted from the Cobb-Douglas Production Function, that is most commonly used functions such as Aschauer 1989, Munnell 1990 and Somik V. Lall. (2007)

2. Research Result and Discussion

The result of data analysis used simple regression of log linear models with the method of Least Squares Dummy Variables (LSDV), coefficient of determination (R2), F- test, t- test using the program Eviews 7 as follow:

$$\ln(Y_{it} - Y_{it-1}) = \begin{array}{l} \alpha_0 + \beta_1 \ln K_{i,t-1} + \beta_2 \ln L_{i,t-1} + \beta_3 \ln PND_{i,t-1} + \beta_4 \ln JL_{i,t-1} + \beta_5 \ln LISTR_{i,t-1} \\ + \beta_6 \ln AIR_{i,t-1} + \beta_7 \ln SPJL_{i,t-1} + \beta_8 \ln SPLISTR_{i,t-1} + \beta_9 \ln SPAIR_{i,t-1} + \varepsilon_{i,t} \end{array}$$

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where:
Y: GDP of each province in Java.
K: The value of non-infrastructure investment.
L: The number of labor (work) for each province.
Road: It is a long road (km) are available in every province. The length of the path used is the length of roads in good condition.
LISTR: Production of electricity (kwh) of electricity the company sold in every province of the country that used all the power of all classes of users.
AIR: The production capacity of clean water (m3/second) which is distributed by the Regional Water Company (PDAM) in each province.

SP: Shows the influence of the spatial nature of an independent variable or indicate an interactive effect between regions. The effect is a form of influence of the spatial dimension of space or territory, which in this study is the influence of a factor of a particular area to other neighboring areas.

PND: Human capital is an index of education of the population of each province and measured by how many years of attending `school. Educational index variable is an index of population education in each province with a scale of 0.00 to 1.00 by using the BPS (BPS, Bappenas and UNDP, 2004).

α: constant
β1 and β2: Investment Coefficient and Employment Coefficient
β3 and β4: Human Capital Coefficient and Coefficient of Road Infrastructure
β5 and β6: Power & Infrastructure Coefficient and Coefficient of Water Infrastructure
β7: Coefficient of Road Infrastructure Other Areas
β8: Coefficient of Regional Electricity Infrastructure Other
β9: Coefficient of Water Infrastructure Other Areas

Then the second stage to calculate the index of education with the formula:

$$IPND = (Xij - Xmin) / (Xmax - Xmin)$$

where:
Xij: Average years of education to the provinces for i j
Xmin: The minimum score
Xmax: The maximum score
α: constant
β1 and β2: Coefficient Coefficient Investment & Employment
β3 and β4: Human Capital Coefficient and Coefficient of Road Infrastructure
β5 and β6: Power & Infrastructure Coefficient Coefficient of Water Infrastructure
β7: Coefficient of Road Infrastructure Other Areas
β8: Coefficient of Regional Electricity Infrastructure Other
β9: Coefficient of Water Infrastructure Other Areas

2.1. Influence of Investment

The regression coefficient of investment variable is 0,7831 and it t-statistic value is 8,536, so it is significant at the 95% confidence level. Investment has a positive effect on economic growth areas with the elasticity of 0.7831 it is shown that every 1% increase in investment will drive the economic growth rate of 0.7831% assuming ceteris paribus. This is consistent with the theory that increasing the capital stock of investment in both domestic and from abroad to increase regional economic output. Based on neoclassical theory that regional economic output growth is influenced by the growth of capital stock, labor force growth and technological progress.

2.2. Labour/Worker

The regression coefficient of worker is -0,4629 and the t-statistic is -0,735, meaning worker variable is not significant at the 95% confidence level. These results indicate that increasing the amount of worker it will decrease the productivity of the regional economy. This is contradictive with the common theory that

labour or worker is input factor of production process, and output of product will increase when labour input increase.

2.3. Human Capital

The regression coefficient of human capital is 0,7921 with the value of t-ststistik of human capital is 2.033 so it is significant at the 95% confidence level. This means that human capital has positive influence toward economic growth. The value of elasticity of the human capital variable is equal to 0.7921 meaning that if the index of human capital increased by 0.1, it can encourage economic growth by 0.079% with the assumption of ceteris paribus.

Table 1.Results Estimates of the Effect of Investment, Employment, Human Capital, Infrastructure and Regional Infrastructure neighbouring Against Economic Growth in Java

Independent Variable	Dependent Variable: PDRB		
	Coefisien	t-statistic	Probability
C	0,2592	0,031	0,975
Investment	0,7831	8,536	0,000
Worker	-0,4629	-0,735	0,466
Human capital	0,7921	2,033	0,048
Infrastructure			
Road	0,0077	0,199	0,843
Electricity	0,2019	3,705	0,001
Drinking water	0,0414	2,738	0,009
Infrstructures of neighbouring area			
Road	-0,0061	-0,048	0,962
electricity	0,1202	0,823	0,415
Drinking water	0,1603	4,798	0,000
Fixed Effects			
Jakarta	-0,3187		
West Java	0,7314		
Central Java	1,1184		
Yogyakarta	-0,9907		
East Java	-0,3995		
Banten	-0,1409		
F-statistic	174,150		
Prob(F-statistic)	0,000		
R2	0.982		
Adj. R2	0.976		

2.4. Influence of Road Infrastructure

The estimation results show that the value of t-statistics of road infrastructure variable is equal to 0.199, this value is not significant at the 95% confidence level. This stated that the road infrastructure in good condition has no significant effect on economic growth in Java Province. Road infrastructure has a positive regression coefficient, and the elasticity value is 0.0077, which means that any improvement by 1% of road infrastructure will increase the economic growth of the province by 0.0077% with caterius paribus assumption.

2.5. Influence of Electricity Infrastructure

The the t-statistic of variable electricity infrastructure amounting to 3.705 which is significant at the 95% confidence level. This results mean that the electricity infrastructure significantly influence the economic growth of the province in Java. the electricity infrastructure has a positive influence and the value of elasticity is equal to 0.2019 it means that every 1% increase in the availability of electrical energy it will encourage economic growth in the area by 0.2019% with caterius paribus assumption. This result are consistent with the theory that increasing the electricity infrastructure will create more economic growth.

2.6. Influence of Drinking Water Infrastructure

The regression coefficient of this variable is positive, which means that the increase in water infrastructure will promote regional economic growth. Elasticity value of this variable is equal to 0.0414. The value of t-statistics of water infrastructure is 2.738 and significant at the 95% confidence level. This means that water infrastructure have a significant effect on economic growth of Java province.. This shows that every 1% increase in water capacity will promote economic growth by 0.0414% assuming ceteris paribus.

3. Conclusion and Implication

3.1. Conclusion

Based on the analysis and discussion the following conclusions are obtained:

- The increasing number of workers who worked no significant effect on regional economic growth
- Human capital has positive effect on economic growth. It means improving the ability of the workforce through education and training will promote economic growth.
- The improvement of road infrastructure does not significantly influence toward economic growth area for the coverage of Java.
- Construction of electricity infrastructure has positive influence toward regional economic growth.
- Improved clean water infrastructure has positive effect on regional economic growth.

3.2. Implication

Government should encourage the factors that significantly influence the economic growth areas such as human capital, non-infrastructure investment, electricity infrastructure, and water infrastructure. There are several possibilities that will occur related to the use of these factors in development policy, namely:

- Human capital provides the greatest impact, particularly in low income areas. If the government encourages the development of human capital through education and training in addition will encourage more rapid economic growth but will also help low-income regions to catch up.
- Non-infrastructure investment can encourage more rapid economic growth in general and Java in high-income areas in particular.
- Increase in electricity infrastructure in addition to encouraging regional economic growth can also promote equitable distribution of income among regions.
- Water infrastructure development will also enhance economic growth and equitable distribution of income among regions. In addition other neighboring areas will also feel the development of this infrastructure.
- Improvement of road infrastructure will effectively promote economic productivity in low-income areas only.

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